****

DOCUMENT CONTROL INFORMATION

DISK NAME: (ARPA) LOGIN NUMBER (UIC): 200,3
FILE NAME: DK0:TDOC.MAE

LABOR CHARGE: 2325-520 MACHINE CHARGE: 2325-520

AUTHOR: Mike Blacko
TITLE: PORTABLE PACKET TERMINAL SUPERVISOR LOGIC DESIGN

DATE MODIFIED: 17 May 1974, 9:30 a.m.

SPECIAL INSTRUCTIONS:

$ to be replaced with lower case delta for final output

CHARS PER LINE: 72 LINES PER PAGE: 52

OUTPUT FORMAT: LP:/PF:FINAL

MARK UP HARD-COPY WITH COLORED PEN OR PENCIL !!

****

DRAFT

MAIN PROGRAM

SUPERVISOR

AUTONOMOUS MODE MODULES

REMOTE

LOCAL

UTILITY ROUTINES

CLEAR = CALL CLEAR (J)
Clears memory/buffer indicated by parameter J
J = 1 = fills PMEM with etx characters
2 = fills TBUF with blank characters
and sets TFLG = 000
3 = fills RBUF(KRB) with blank
characters, sets RFLG(KRB) = 000
and sets KRB to next RBUF

COMPARE = CALL COMPARE (TEST, STRING,CFLG)
Compares character strings TEST and STRING, ignoring lead
and trailing blanks in STRING
CFLG = 0 = strings are equal
1 = strings are unequal

MOVE = CALL MOVE (FROM,TO)
Moves characters from one string into another
until an etx character is encountered

SCAN = CALL SCAN (INT)
Scans CPU interrupt levels three, two and one, EDIT is called
if level three interrupt is encountered and scanning continues
INT = 2 = Interrupt level two was encountered
1 = Interrupt level one was encounterwd
0 = Neither interrupt level was encountered

PERIPHERAL CONTROL ROUTINES

DISPLAY = CALL DISPLAY (MSG, DFLG)
Clears PMEM and fills PMEM with character string MSG,
peripheral is set to compose mode and return is made
according to DFLG
DFLG = 0 = Return when either carriage return or acknowledge
keys are struck and set DFLG accordingly
1 = Return when carriage return is struck
2 = Return when acknowledge key is struck

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EDIT - CALL EDIT
Deletes the last display line (twenty character segment) from PMEM

ERRMSG - CAL ERRMSG (MSG,DFLG)
Appends 'INVALID RESPONSE' to beginning of MSG and calls DISPLAY

PRINT - CALL PRINT (MSG)
Fills the peripheral FIFO with character string MSG and sets the peripheral to print

RDPMEM - CALL RDPMEM (BUF)
Transfers characters from PMEM to BUF until an etx character is encountered

MODEM CONTROL ROUTINES

CLRSND - Clear to send interrupt routine
Sends start transmission control to modem and resets the transmission timer

EOT - End of transmission interrupt service routine
Starts the transmission timer and resets the receiver

HDRDY - Header syndrome ready interrupt Service routine
Sends the text length to the modem, checks the ID, checks for ACK packets and sets RFLG(RI) according to the header syndrome

REQSND - CALL REQSND
Sends the request to send command to the modem (begins modem transmission sequence)

RESET - CALL RESET
Resets the receiver (begins the modem receive sequence) and inhibits transmission

RGUP - Receive gate up interrupt service routine
Acknowledges the modem and continues receive sequence

TXTRDY - Text syndrome ready interrupt service routine
Sets RFLG(RI) according to the text syndrome, sets RI to the next receive buffer and resets the receiver (beginning another receive sequence)

XMIT - CALL XMIT
Fills the transmission buffer if it is free and there is a packet waiting to be transmitted, otherwise monitors transmission and re-transmits if necessary

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https://archive.org/details/term-sup-logic-des

DEFINITION OF VARIABLES

BFLG = Working buffer flag
= 0 = Buffer empty
1 = Buffer full, awaiting processing

BUF = Working buffer

$ = Transmission timer period

CFLG = Comparison flag (see subroutine COMPARE)

DFLG = Display flag (See subroutine DISPLAY)

DMA = DMA Flag
= Off = Modum-CPU data transfer not in progress
On = Modum-CPU data transfer in progress

EPKT = Error statistics packet

etx = End-of-text byte

HDRCNT = Packet header length

IFLG = Peripheral mode type flag
= 0 = Peripheral not using data bus
1 = Peripheral expecting data from CPU over data bus

INT = Interrupt level indicator

KRB = Pointer to next receive buffer to be processed by the peripheral (printed and/or displayed)

MSG1 = 'ALOHA, REMOTE, LOCAL
ENTER MODE: '

MSG2 = 'ENTER ID: '

MSG3 = 'YES OR NO
ECHO TO PRINTER? '

MSG4 = 'PRINTER,DISPLAY,BOTH
RCV TRAFFIC: '

MSG5 = 'TOO MANY ERRORS IN
REMOTE LOAD '

NEXT = Denotes next interrupt service routine in receive or transmit sequence

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PAR - Peripheral address register

PMEM - Peripheral memory

PRNT - Keyboard-printer echo flag
= ON = Echo all keyboard activity to printer
OFF = Do not echo

RBUF - Receive buffer

RDISP - Received packet disposition flag
= 1 = Print all received packets
2 = Display " " "
3 = Both " " "

RFLG - Receive buffer status flag
= 000 = Open
xx1 = Header parity error
x1x = Text parity error
1xx = Reserved (active or waiting for peripheral processing

RI - Pointer to current receive buffer

RMAX - Number of receive buffers allocated

TBUF - Transmit buffer

TFLG - Transmit buffer status flag
= 0 = Open
1 = Occupied awaiting transmission
2 = " after transmission
3 = " " 1st retransmission
4 = " " 2nd "
5 = " " 3rd "

TFMSG - Transmission failed message

TMAX - Re-transmission limit (=3)

TXTCNT - Packet text length

XFLG - Transmission flag (See subroutine XMIT)

XMIT - Transmit Flag
= Off = Inhibit transmission
On = Allow transmission

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Peripheral Modes:

Null	1000	Peripheral inactive
Write PMEM	1001	PAR reset (if f14 reset), expects 1 ROUT per character to follow, PAR incremented after each character received
Read PMEM	1010	Same as write except 1 RIN per character
Print FIFO	1011	Twenty characters from FIFO printed
Load FIFO	1100	Expects 1 ROUT per character to follow (load in twenty character sets)
Compose	1101	Keyboard free for character entry, echoed to display, terminated with carriage return

Peripheral flags:

f8	Set/reset mode
f14	Enable/disable address reset
f15	Ack peripheral interrupt

Peripheral Interrupts:

Level 1	Carriage return struck
Level 2	Ack key struck
Level 3	Delete last display line

Modem Control Bits:

Start transmission	00
Set text count	01
Request to send	10
Reset receiver	11

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Modem flags:

f11	Modem control to follow
f12	Ack modem interrupt

Modem interrupts:

All level 0 (See modem sequences)

Modem activity sequences:

Transmit sequence:

```
SFLG 11
ROUT 10,a(HDRCNT)          Request to send
PFLG 11
```

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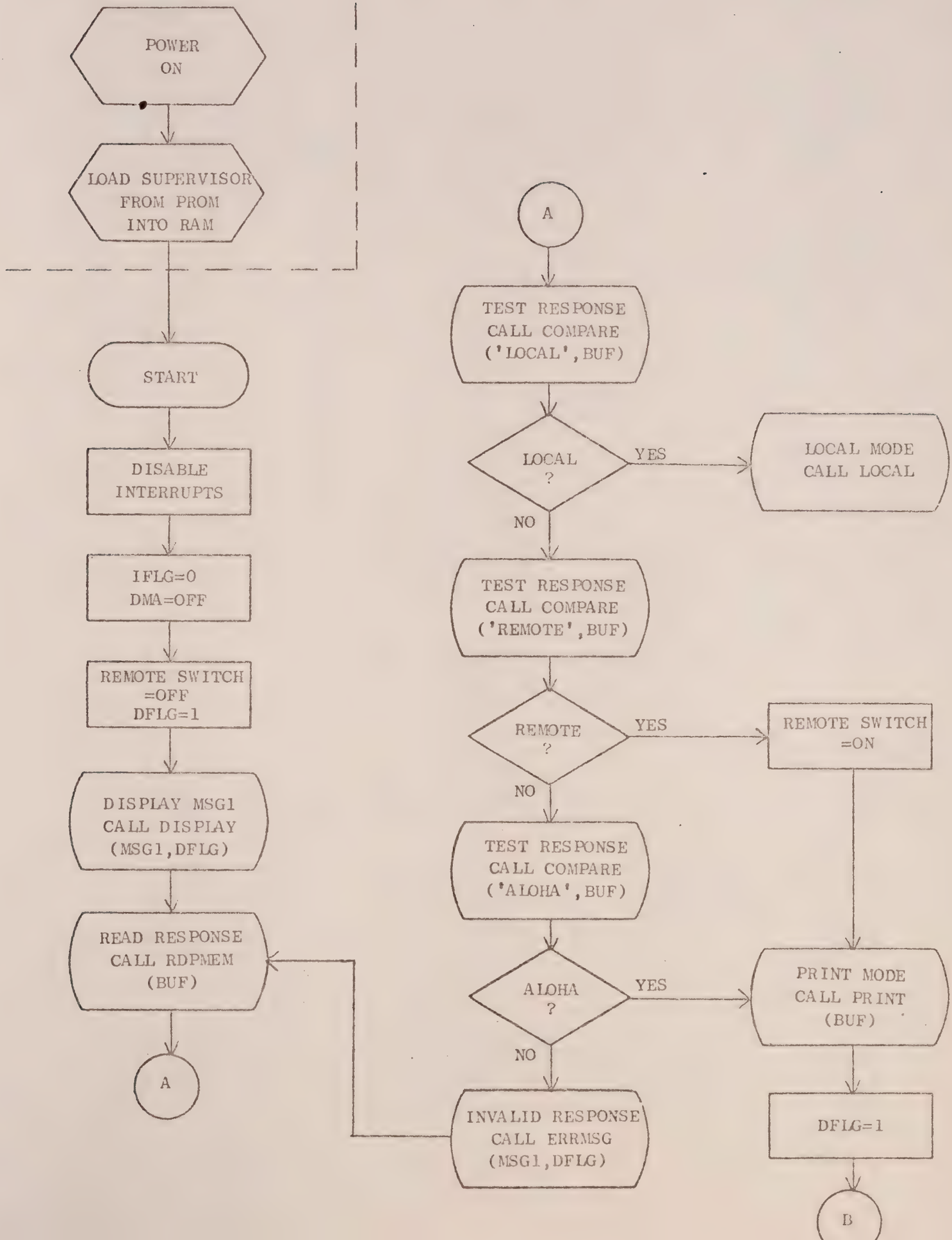
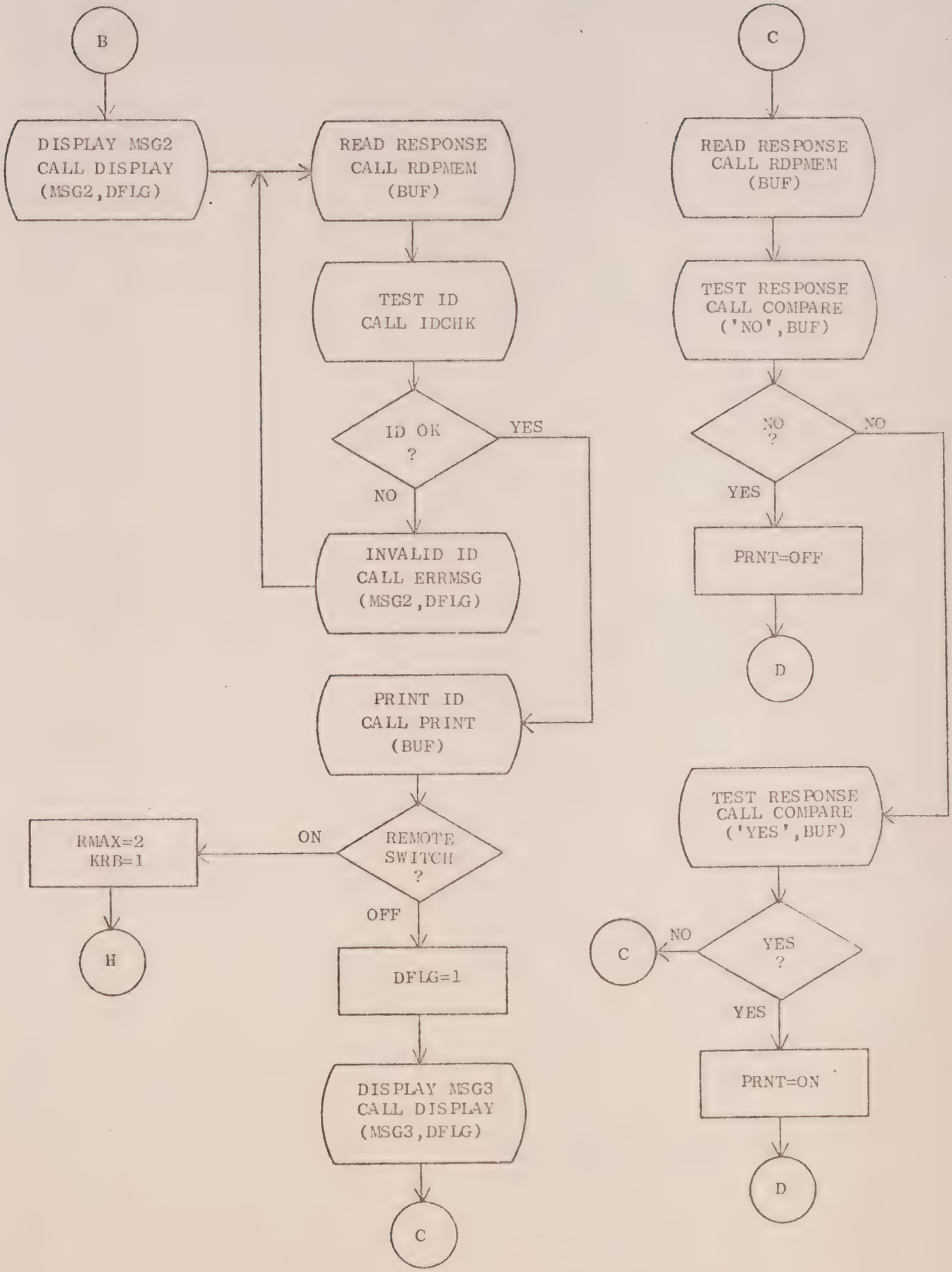
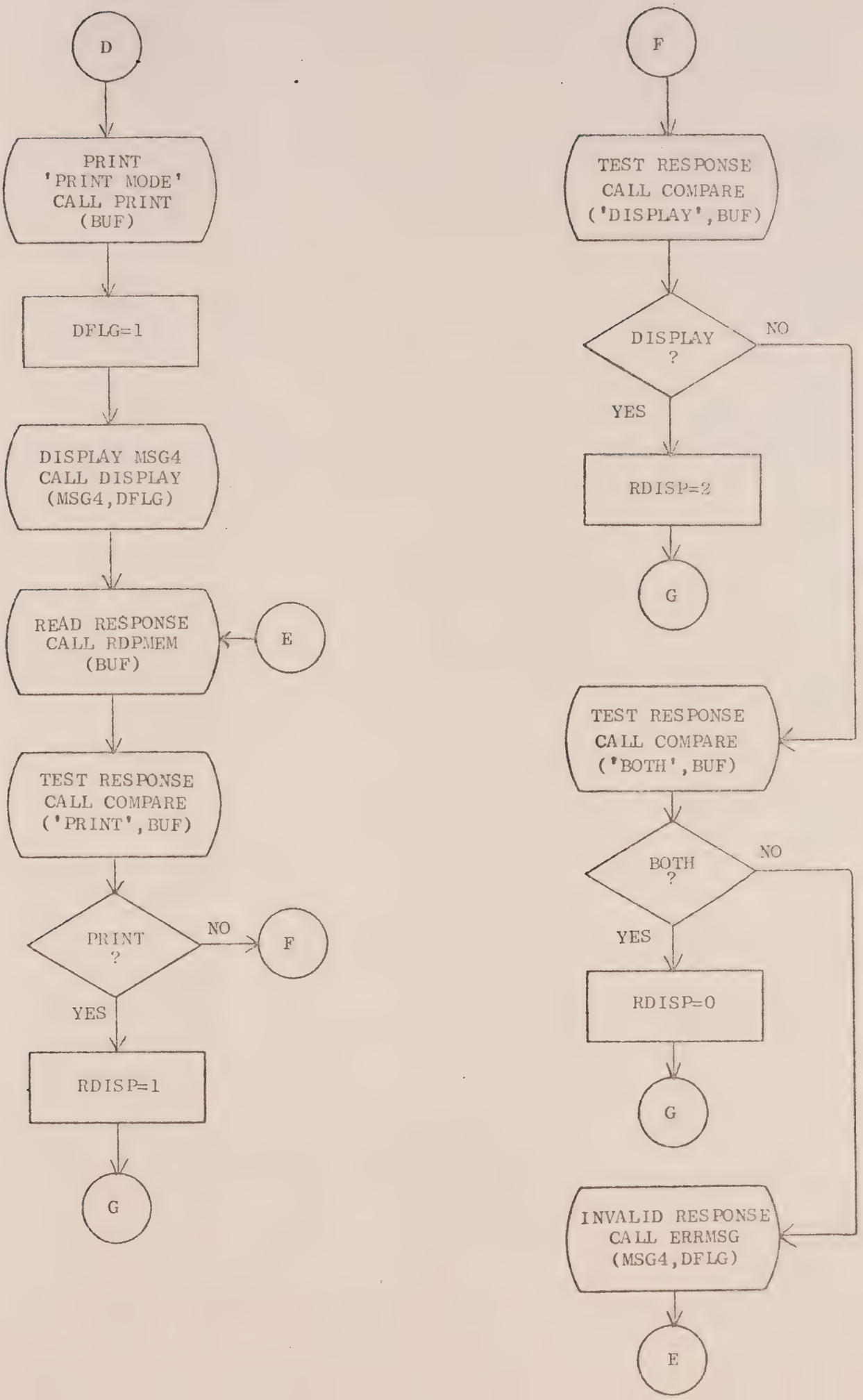
```
        ***  Clear to send interrupt from modem

             PFLG 12                        Ack interrupt
             SFLG 11
             ROUT 00                        Start transmission
             PFLG 11

        ***  Transmission complete interrupt from modem

             PFLG 12                        Ack interrupt

Receive sequence:

             SFLG 11
             ROUT 11,HDRCNT+6(RBUF)         Reset receiver
             PFLG 11

        ***  Receive gate up interrupt from modem

             PFLG 12                        Ack interrupt

        ***  Header syndrome ready interrupt from modem

             PFLG 12                        Ack interrupt
             SFLG 11
             ROUT 01,TXTCNT                 Set text count
             FPLG 11

        ***  Text syndrome ready interrupt from modem

             PFLG 12                        Ack interrupt
```

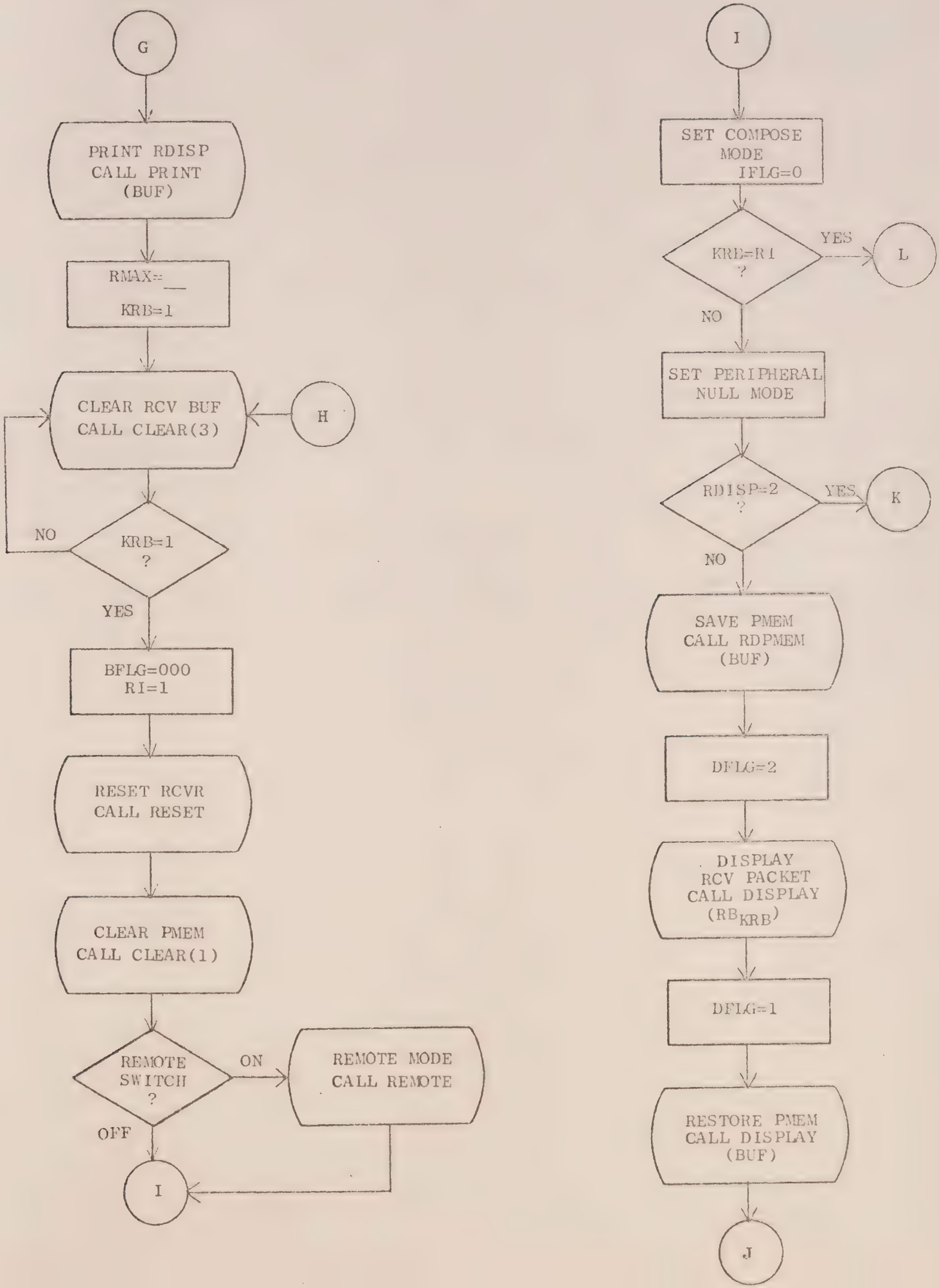
SUPERVISOR

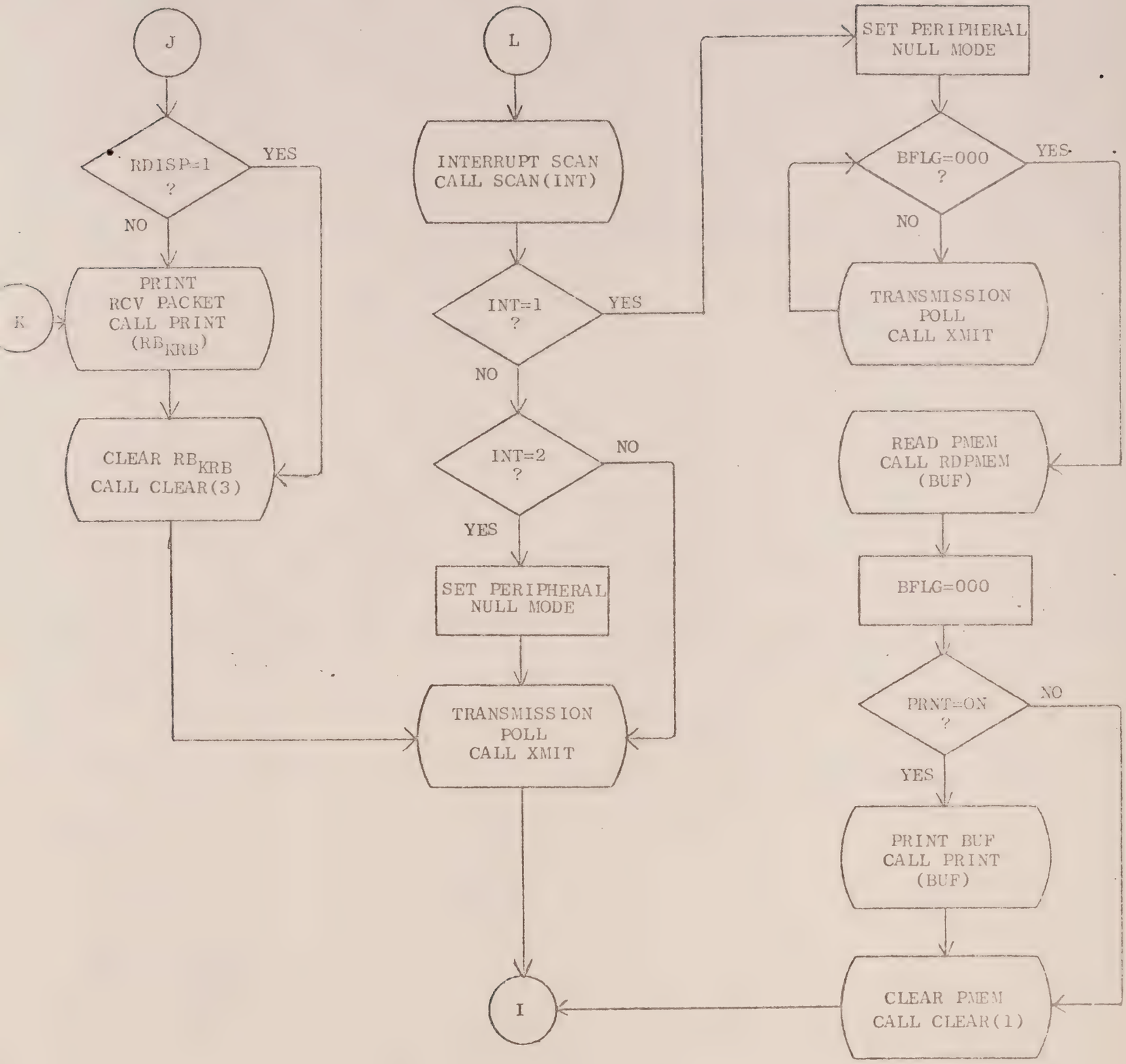
(RAMLDR - RAM LOADER)




B
DISPLAY MSG2
CALL DISPLAY
(MSG2,DFLG)
READ RESPONSE
CALL RDPMEM
(BUF)
TEST ID
CALL IDCHK
ID OK
?
YES
NO
INVALID ID
CALL ERRMSG
(MSG2,DFLG)
PRINT ID
CALL PRINT
(BUF)
REMOTE
SWITCH
?
ON
OFF
RMAX=2
KRB=1
H
DFLG=1
DISPLAY MSG3
CALL DISPLAY
(MSG3,DFLG)
C
C
READ RESPONSE
CALL RDPMEM
(BUF)
TEST RESPONSE
CALL COMPARE
('NO',BUF)
NO
?
NO
YES
PRNT=OFF
D
TEST RESPONSE
CALL COMPARE
('YES',BUF)
C
NO
YES
?
YES
PRNT=ON
D

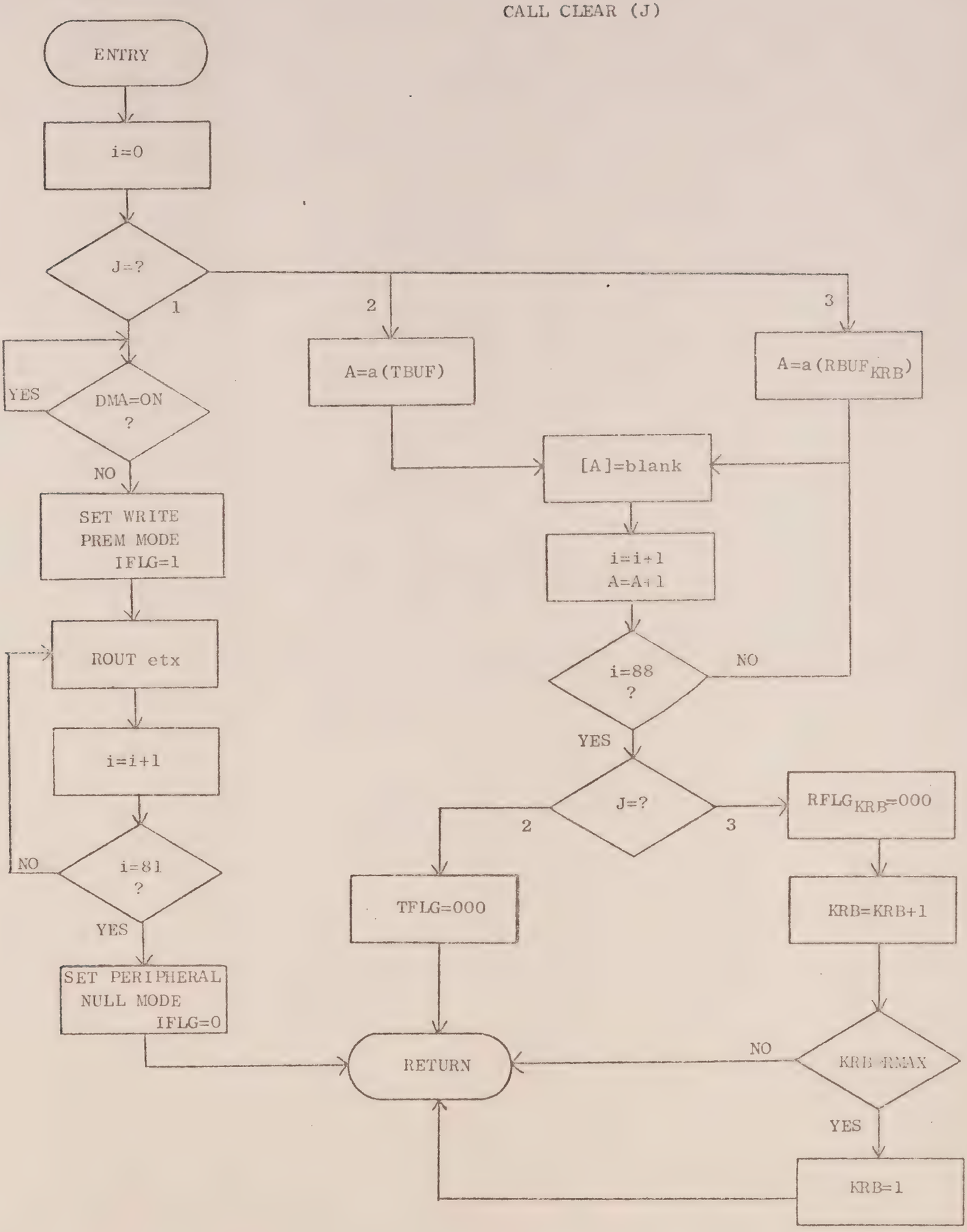

D
PRINT
'PRINT MODE'
CALL PRINT
(BUF)
DFLG=1
DISPLAY MSG4
CALL DISPLAY
(MSG4,DFLG)
READ RESPONSE
CALL RDPMEM
(BUF)
E
TEST RESPONSE
CALL COMPARE
('PRINT',BUF)
PRINT
?
NO
F
YES
RDISP=1
G
F
TEST RESPONSE
CALL COMPARE
('DISPLAY',BUF)
DISPLAY
?
NO
YES
RDISP=2
G
TEST RESPONSE
CALL COMPARE
('BOTH',BUF)
BOTH
?
NO
YES
RDISP=0
G
INVALID RESPONSE
CALL ERRMSG
(MSG4,DFLG)
E


G
PRINT RDISP
CALL PRINT
(BUF)
RMAX=__
KRB=1
CLEAR RCV BUF
CALL CLEAR(3)
H
NO
KRB=1
?
YES
BFLG=000
RI=1
RESET RCVR
CALL RESET
CLEAR PMEM
CALL CLEAR(1)
REMOTE
SWITCH
?
ON
REMOTE MODE
CALL REMOTE
OFF
I
I
SET COMPOSE
MODE
IFLG=0
KRB=RI
?
YES
L
NO
SET PERIPHERAL
NULL MODE
RDISP=2
?
YES
K
NO
SAVE PMEM
CALL RDPMEM
(BUF)
DFLG=2
DISPLAY
RCV PACKET
CALL DISPLAY
(RB KRB)
DFLG=1
RESTORE PMEM
CALL DISPLAY
(BUF)
J

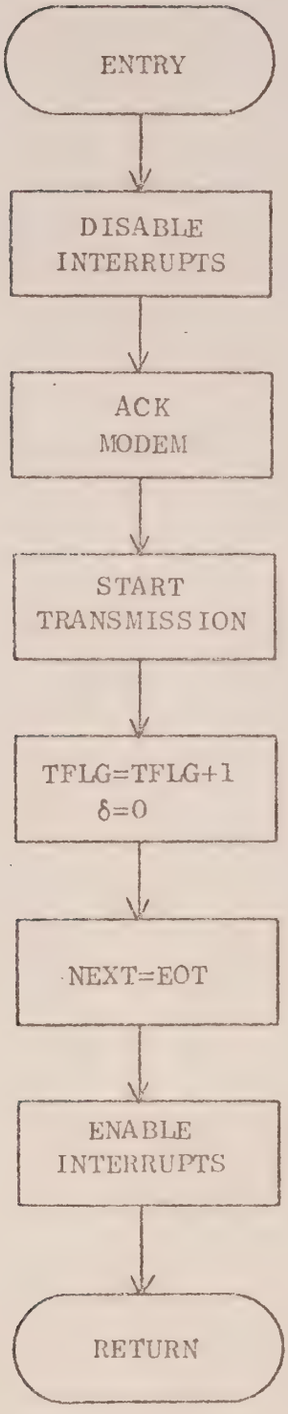

J
RDISP=1 ?
YES
NO
K
PRINT RCV PACKET CALL PRINT (RB_{KRB})
CLEAR RB_{KRB} CALL CLEAR(3)
L
INTERRUPT SCAN CALL SCAN(INT)
INT=1 ?
YES
NO
INT=2 ?
NO
YES
SET PERIPHERAL NULL MODE
TRANSMISSION POLL CALL XMIT
I
SET PERIPHERAL NULL MODE
BFLG=000 ?
YES
NO
TRANSMISSION POLL CALL XMIT
READ PMEM CALL RDPMEM (BUF)
BFLG=000
PRNT=ON ?
NO
YES
PRINT BUF CALL PRINT (BUF)
CLEAR PMEM CALL CLEAR(1)

CLEAR

CALL CLEAR (J)

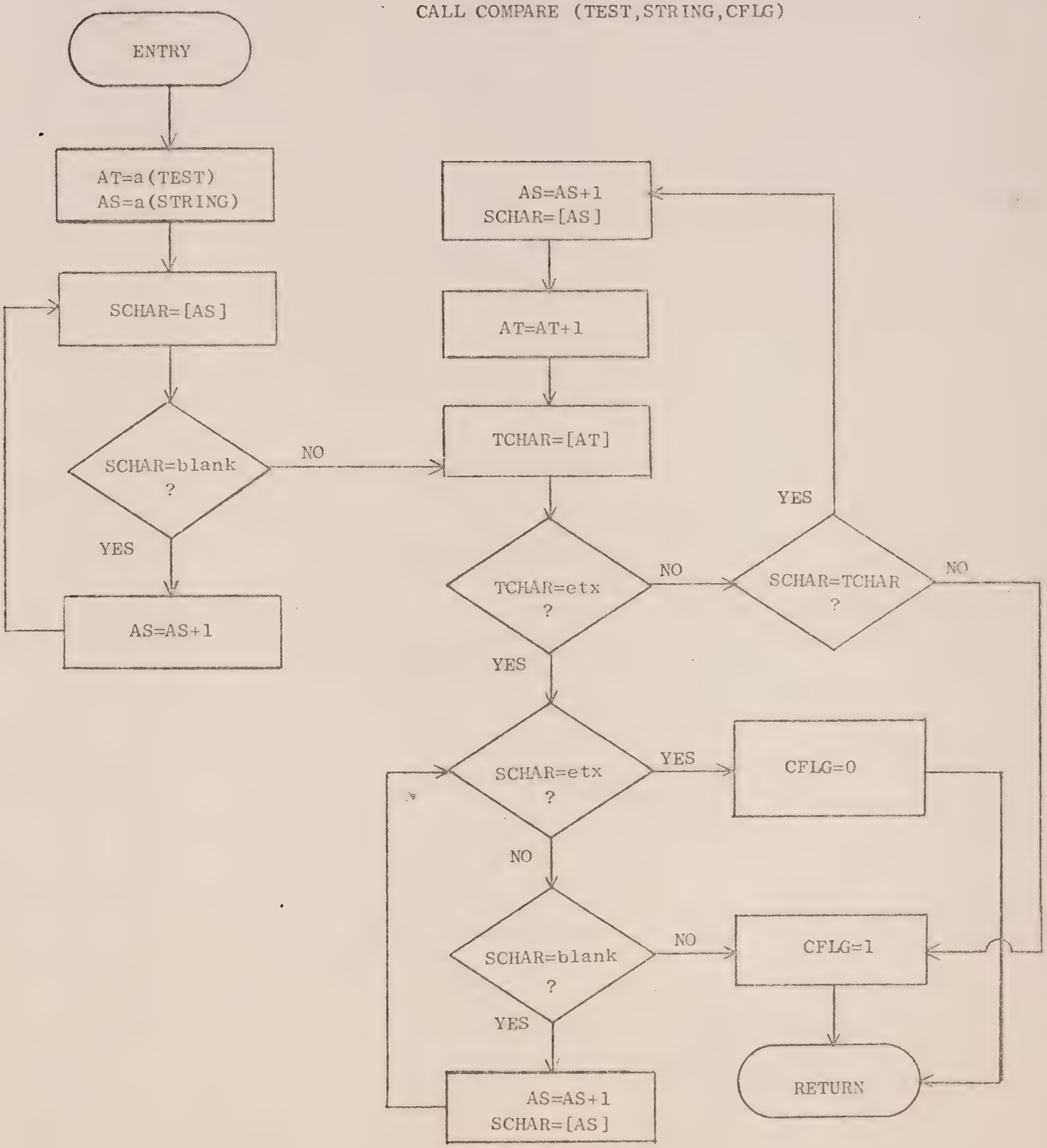


CLRSND


ENTRY
DISABLE INTERRUPTS
ACK MODEM
START TRANSMISSION
TFLG=TFLG+1
δ=0
NEXT=EOT
ENABLE INTERRUPTS
RETURN

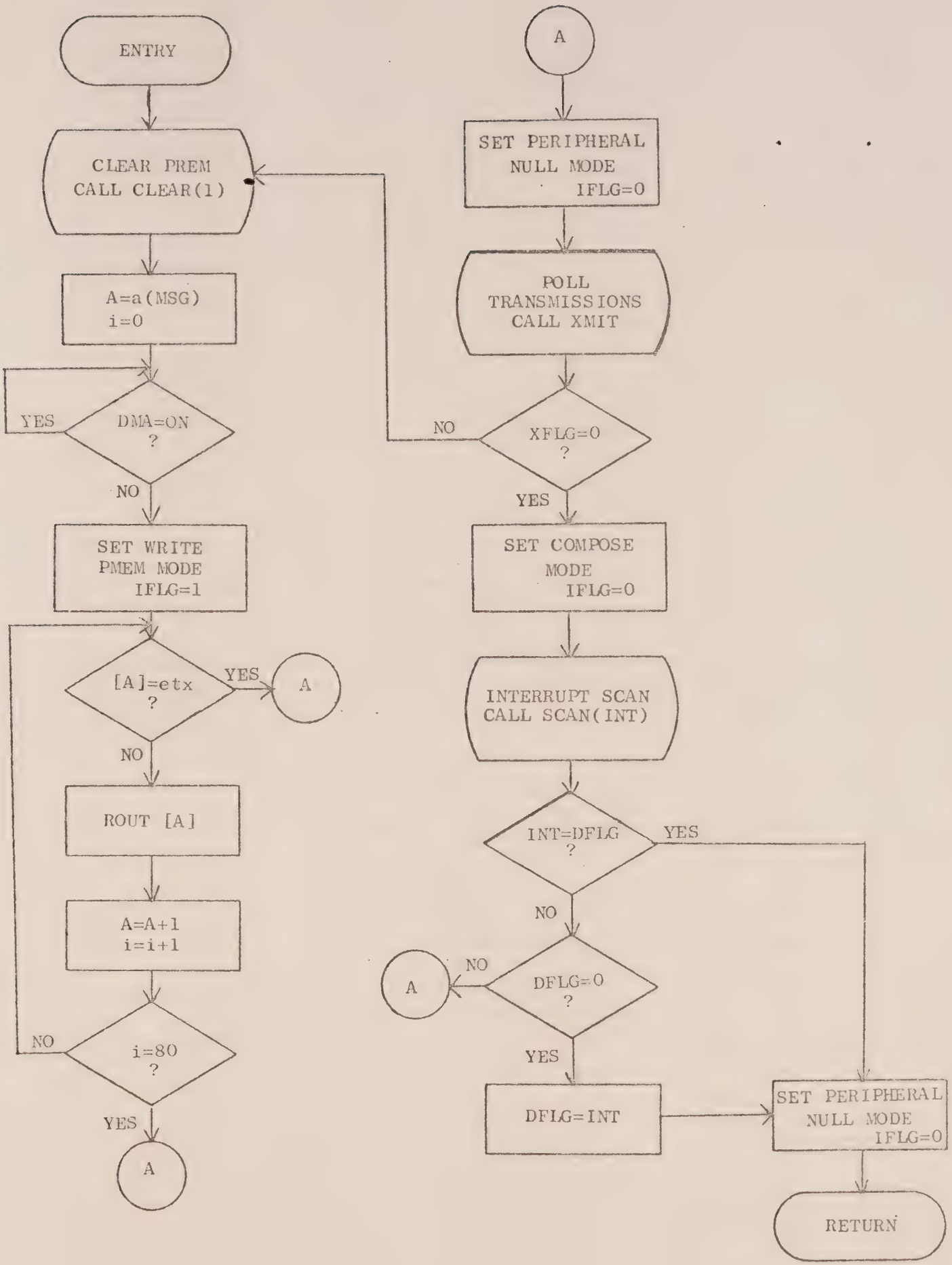
COMPARE

CALL COMPARE (TEST,STRING,CFLG)



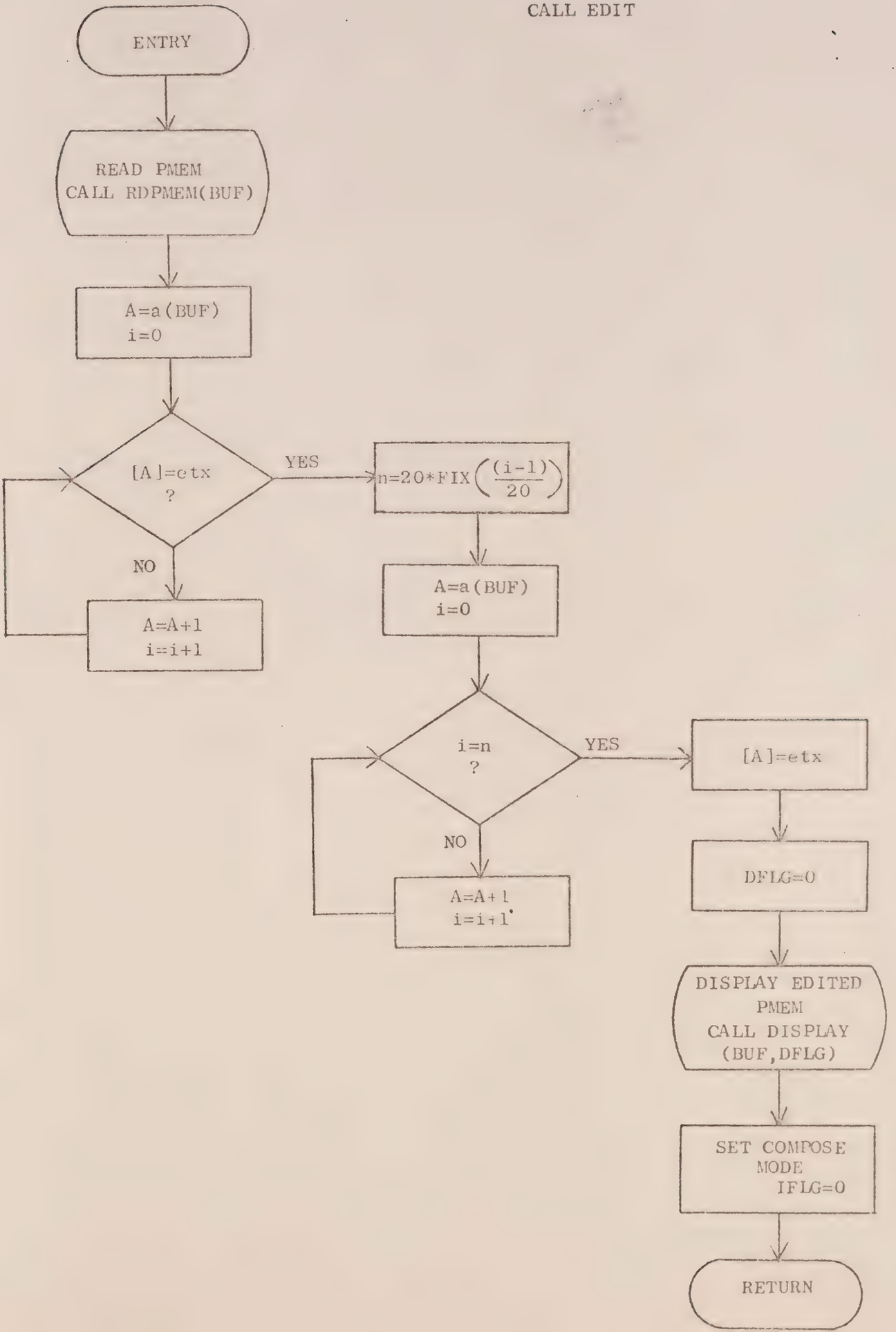
DISPLAY

CALL DISPLAY (MSG,DFLG)

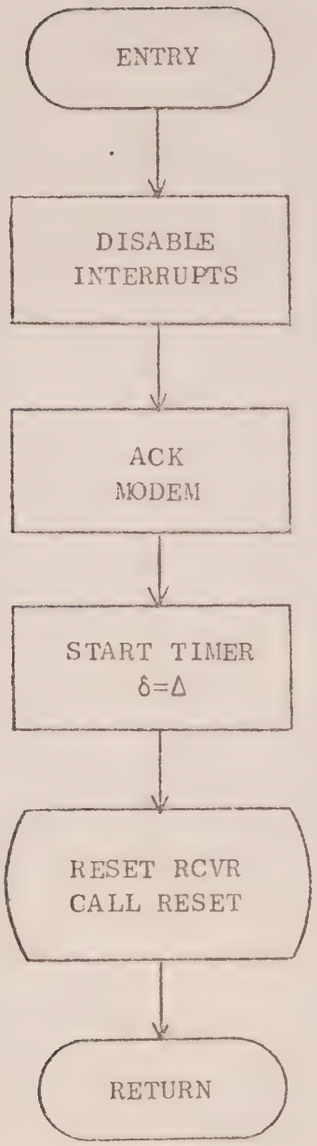


EDIT

CALL EDIT

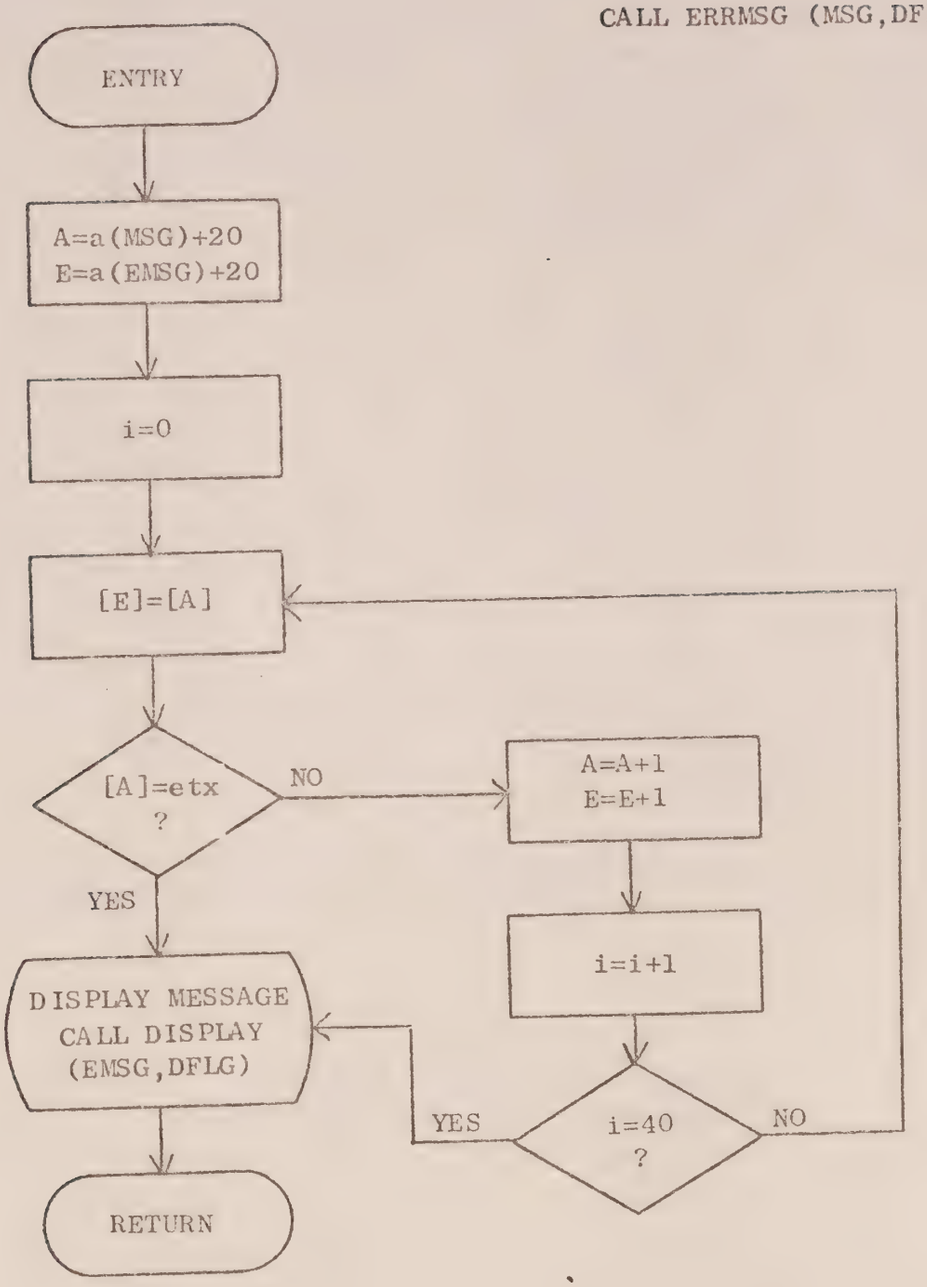


EOT

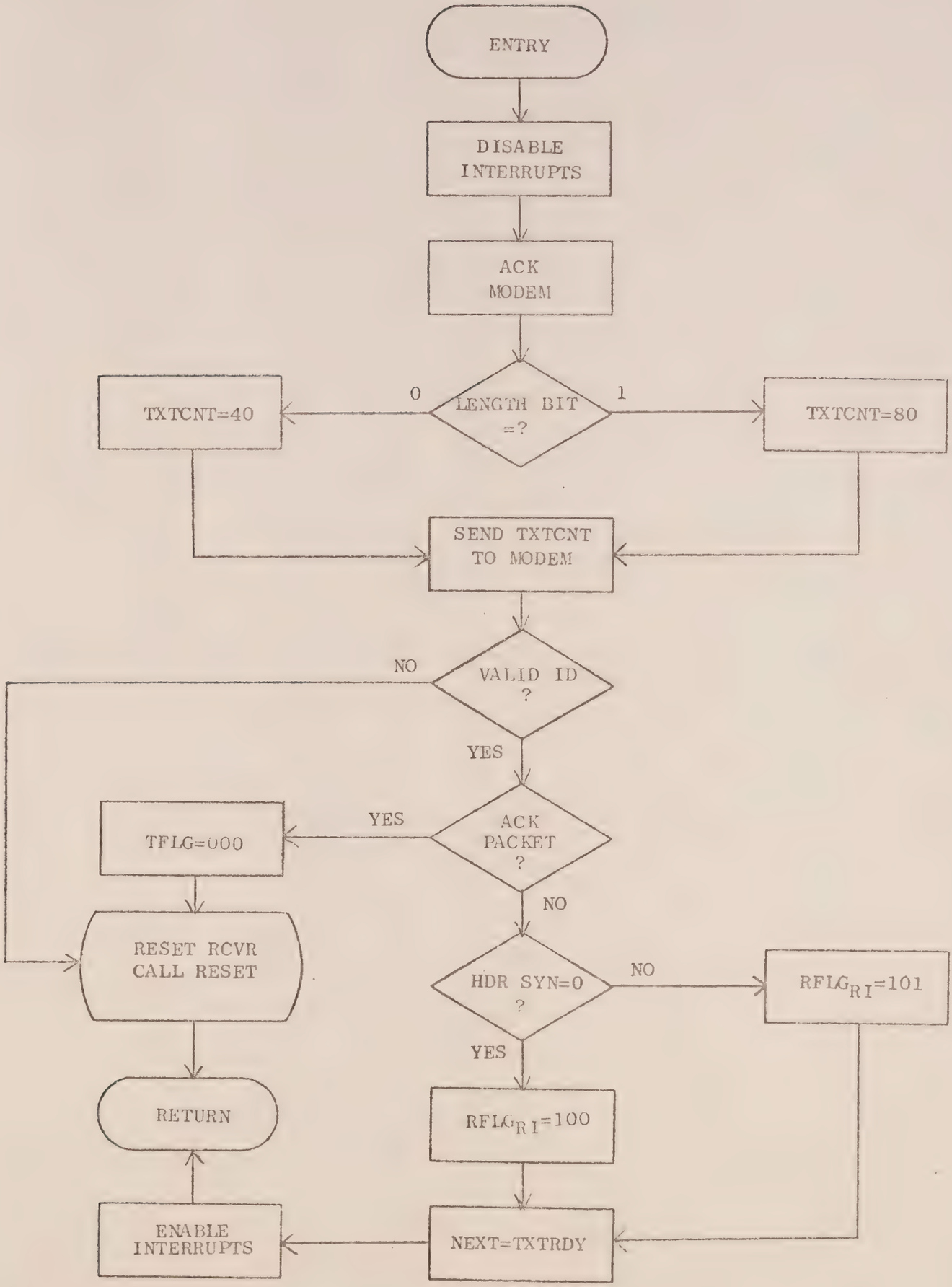

ENTRY
DISABLE INTERRUPTS
ACK MODEM
START TIMER δ=Δ
RESET RCVR CALL RESET
RETURN

ERRMSG

CALL ERRMSG (MSG,DFLG)

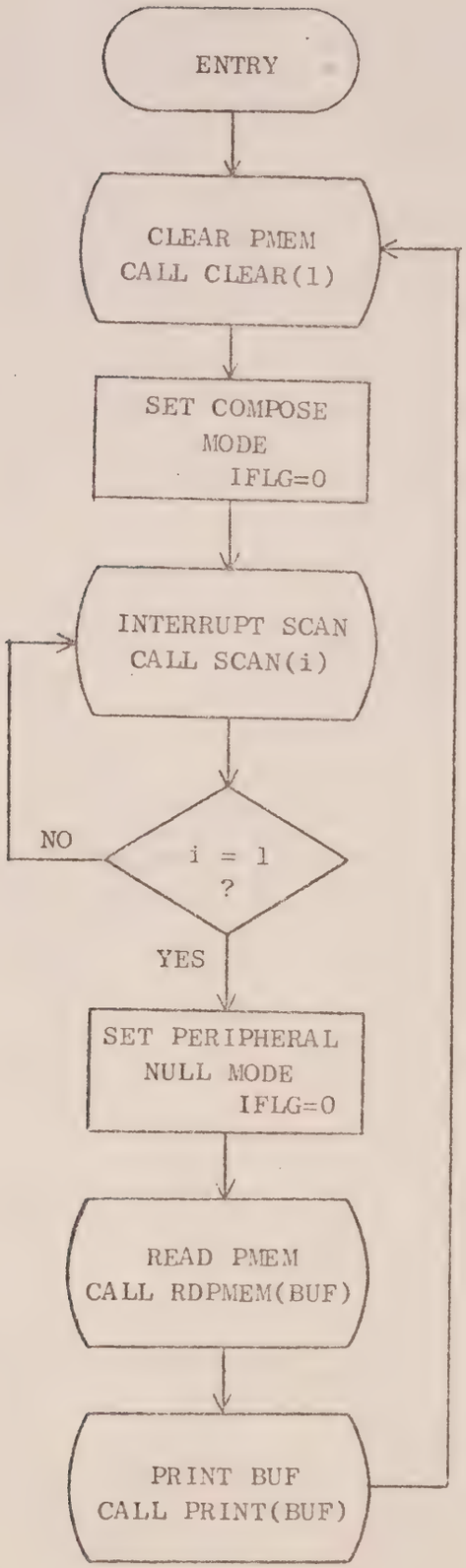


HDRDY


ENTRY
DISABLE INTERRUPTS
ACK MODEM
LENGTH BIT =?
0
1
TXTCNT=40
TXTCNT=80
SEND TXTCNT TO MODEM
VALID ID ?
NO
YES
ACK PACKET ?
YES
TFLG=000
NO
RESET RCVR CALL RESET
HDR SYN=0 ?
NO
RFLG$_{RI}$=101
YES
RETURN
RFLG$_{RI}$=100
ENABLE INTERRUPTS
NEXT=TXTRDY

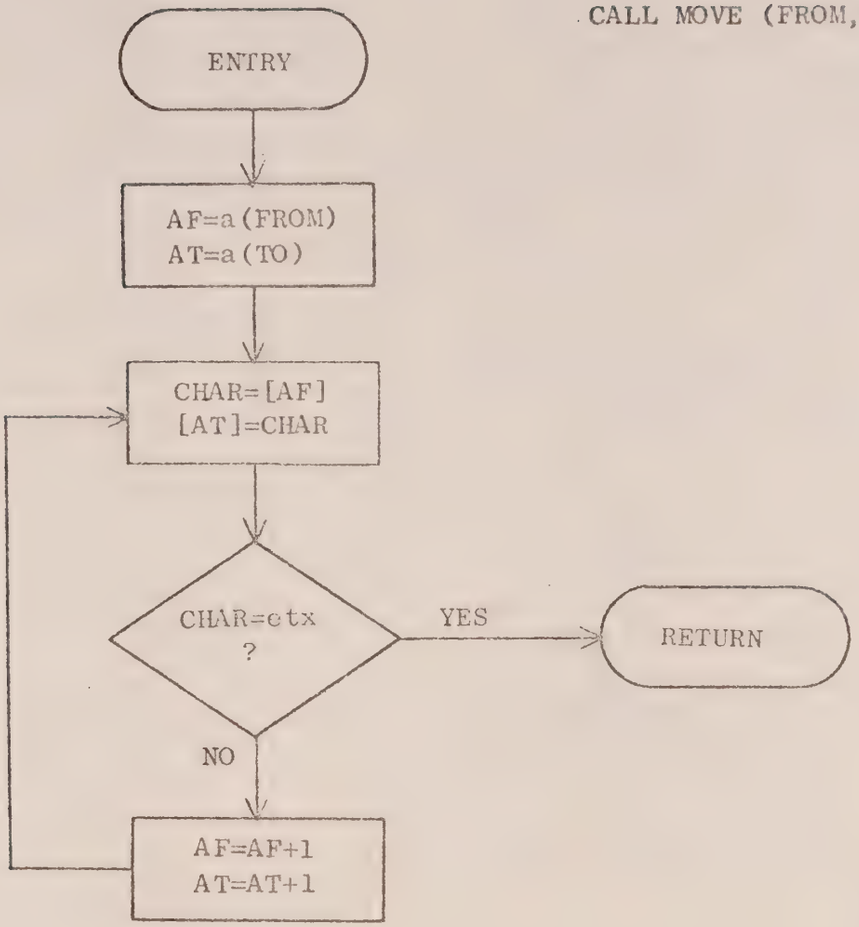
LOCAL

CALL LOCAL



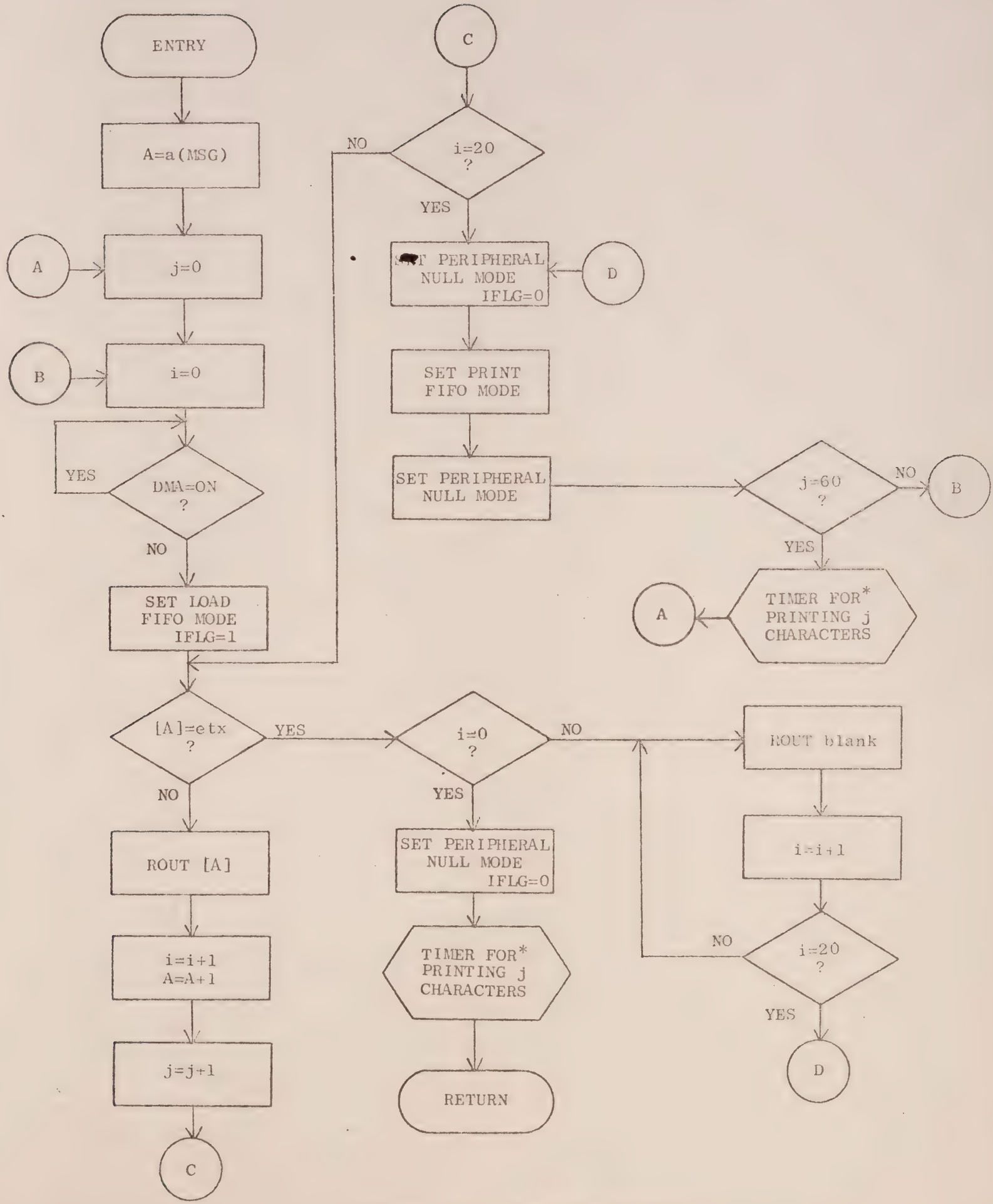
MOVE

CALL MOVE (FROM,TO)



PRINT

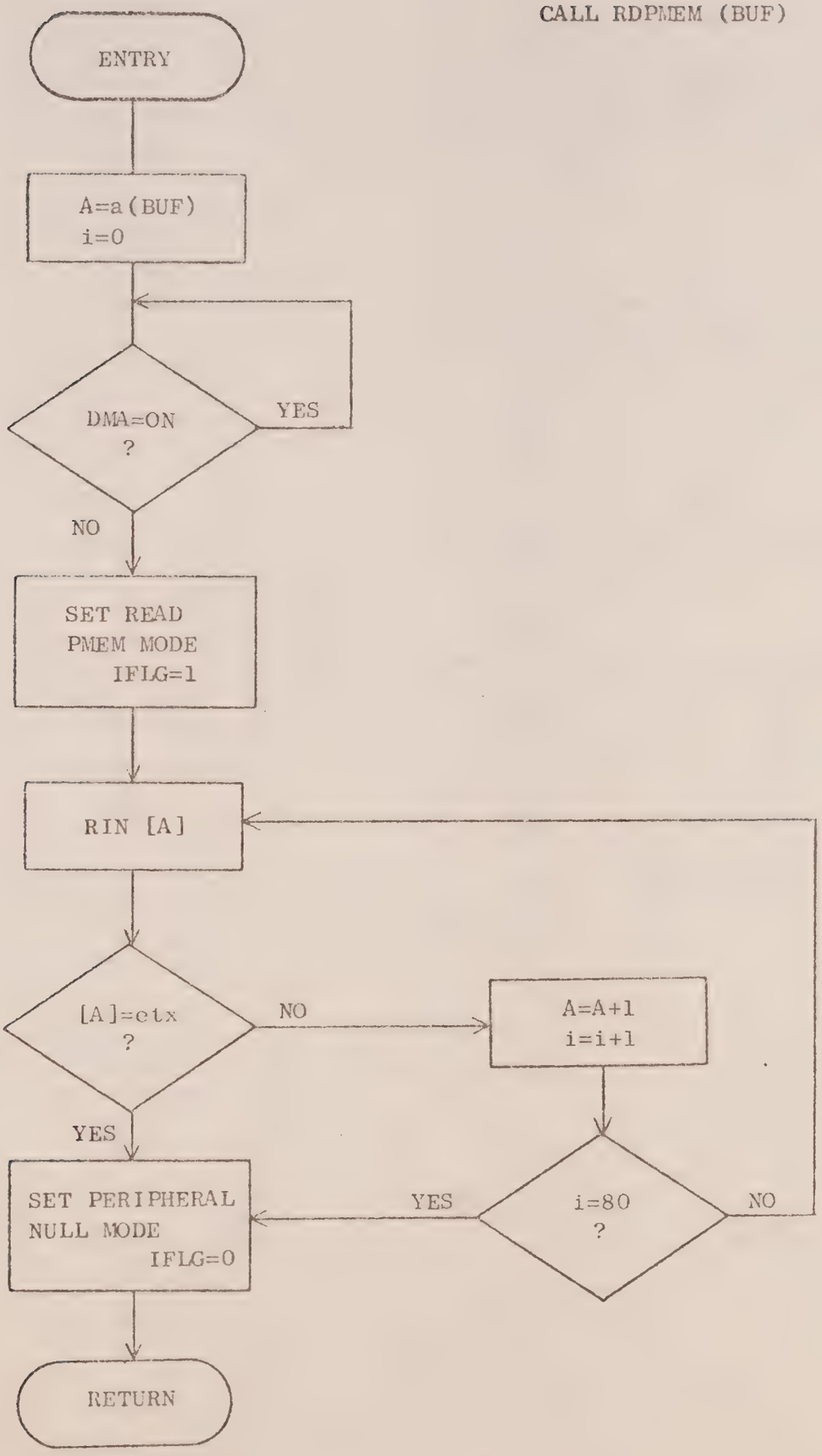
CALL PRINT (MSG)



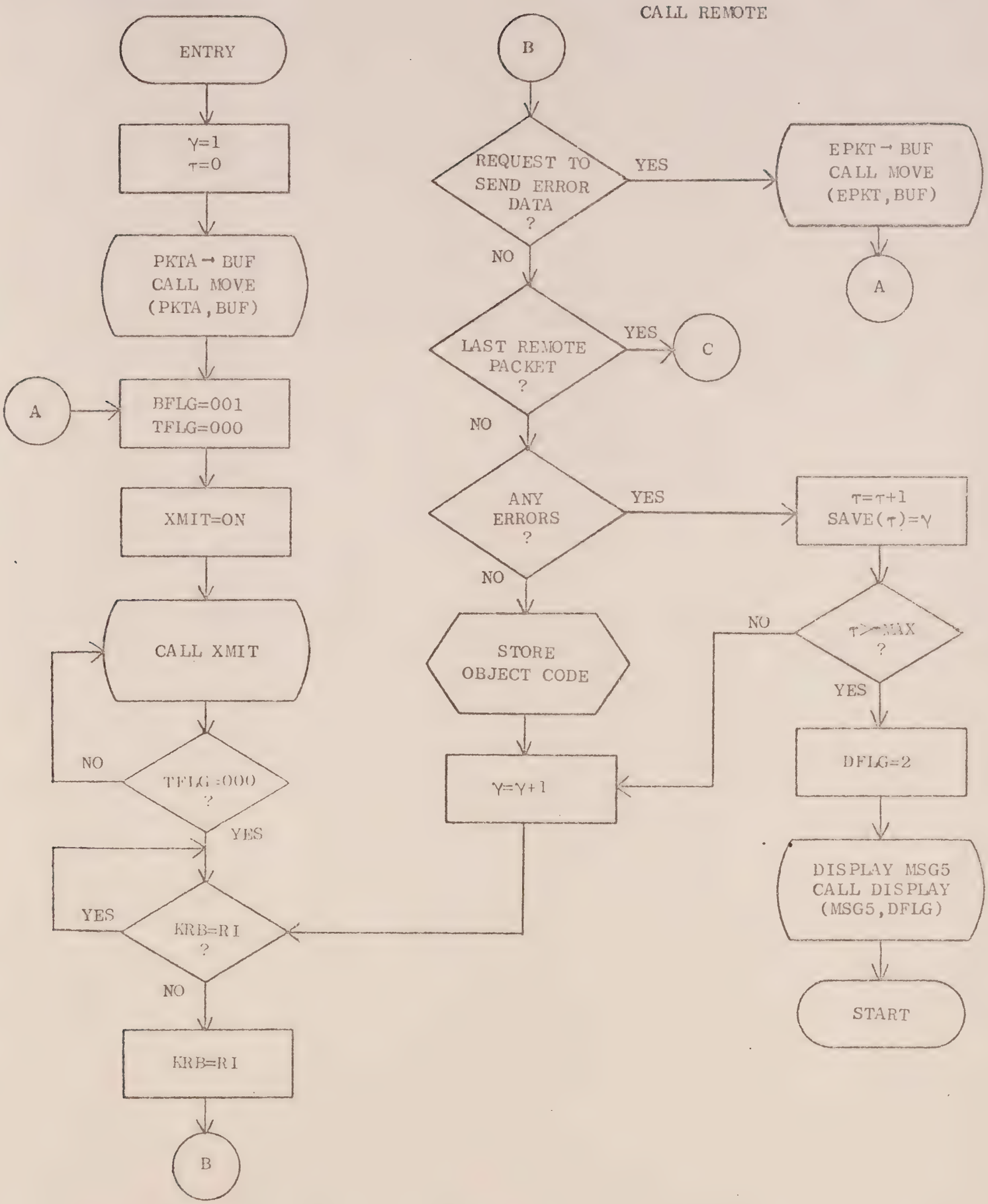
* INCLUDES 'CALL XMIT' WITHIN LOOP.

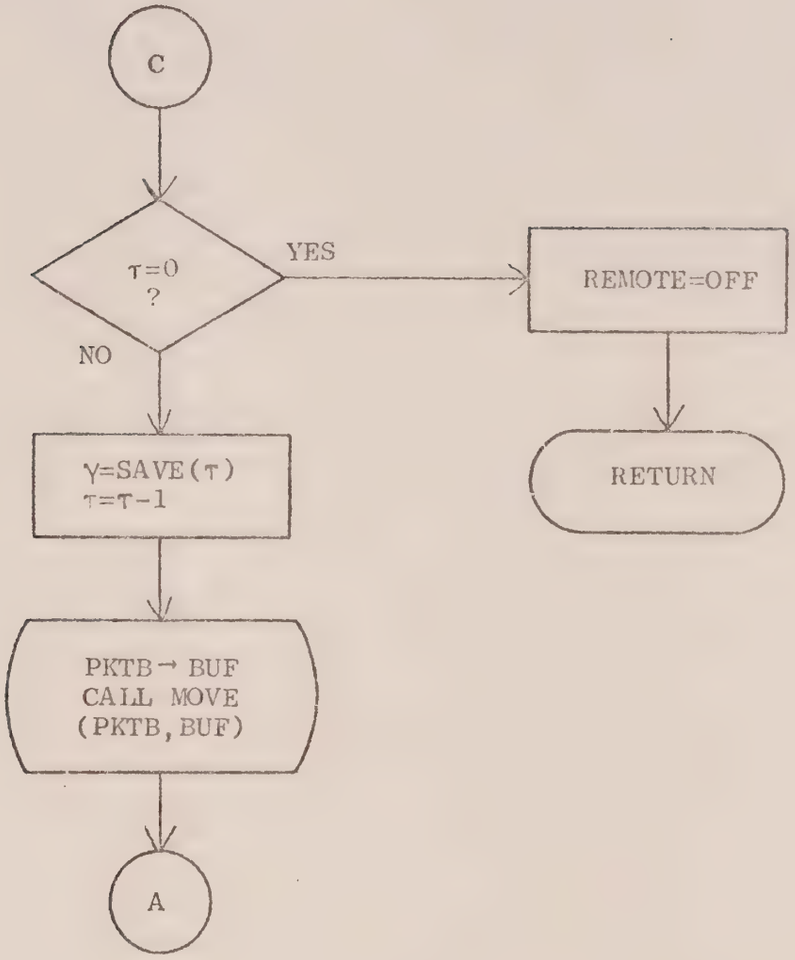
RDPMEM

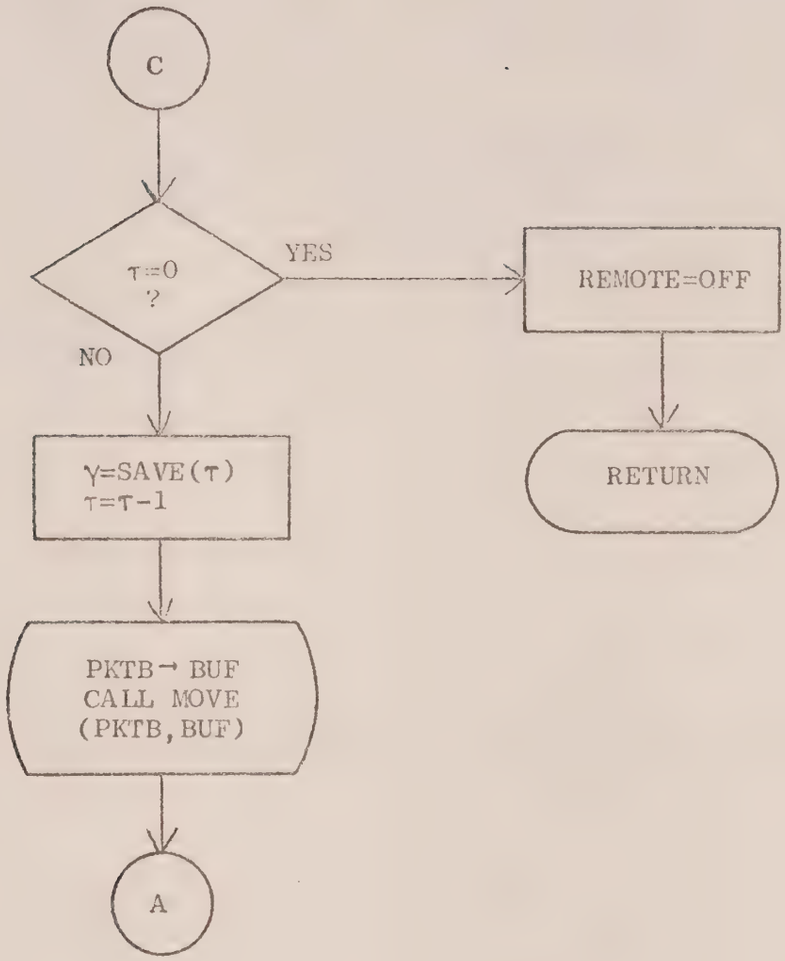
CALL RDPMEM (BUF)



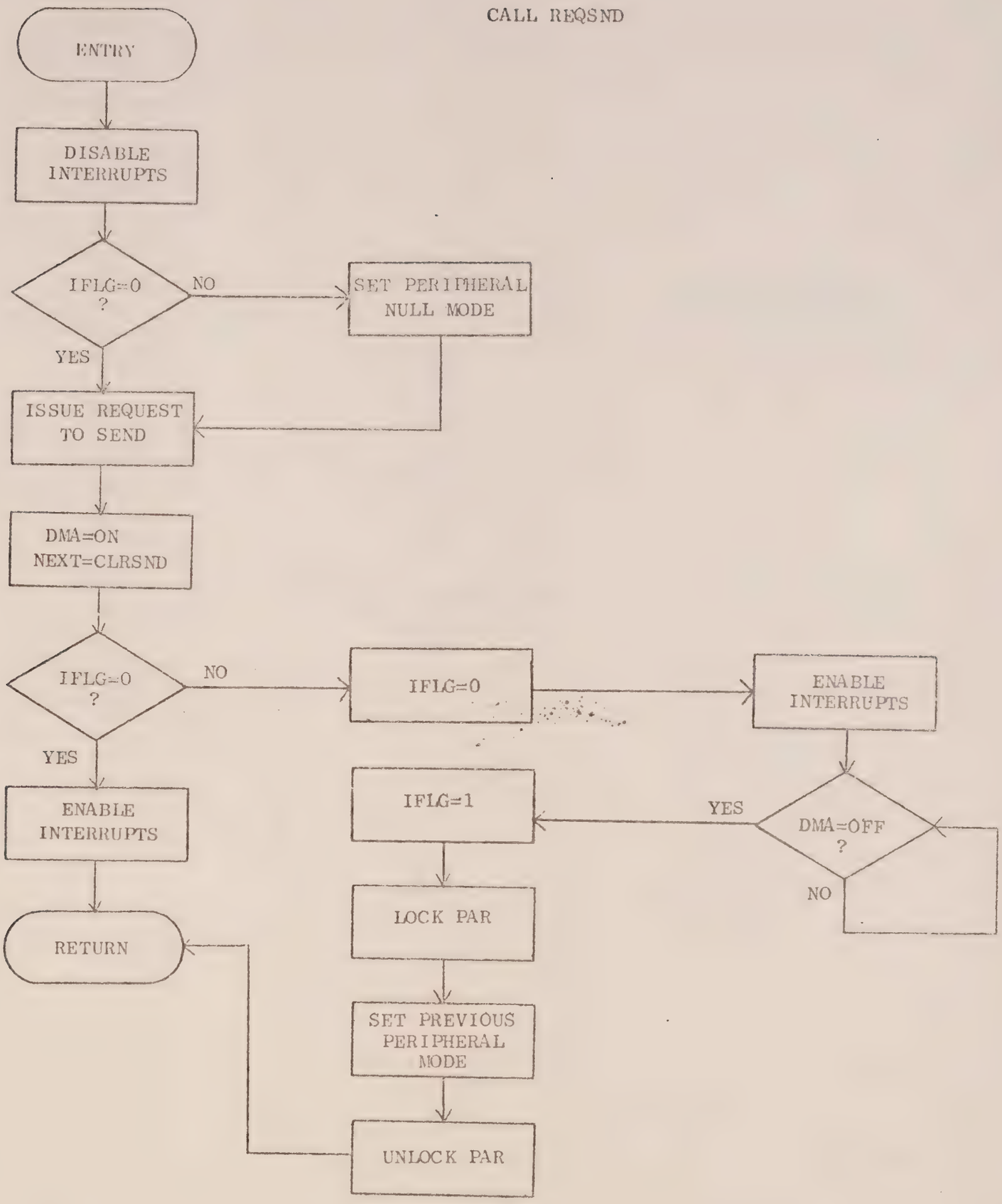
REMOTE


ENTRY
γ=1
τ=0
PKTA → BUF
CALL MOVE
(PKTA, BUF)
A
BFLG=001
TFLG=000
XMIT=ON
CALL XMIT
NO
TFLG=000
?
YES
YES
KRB=RI
?
NO
KRB=RI
B
CALL REMOTE
B
REQUEST TO
SEND ERROR
DATA
?
YES
EPKT → BUF
CALL MOVE
(EPKT, BUF)
A
NO
LAST REMOTE
PACKET
?
YES
C
NO
ANY
ERRORS
?
YES
τ=τ+1
SAVE(τ)=γ
NO
τ>MAX
?
NO
YES
STORE
OBJECT CODE
γ=γ+1
DFLG=2
DISPLAY MSG5
CALL DISPLAY
(MSG5, DFLG)
START


C
τ=0
?
YES
REMOTE=OFF
NO
γ=SAVE(τ)
τ=τ-1
RETURN
PKTB→ BUF
CALL MOVE
(PKTB, BUF)
A

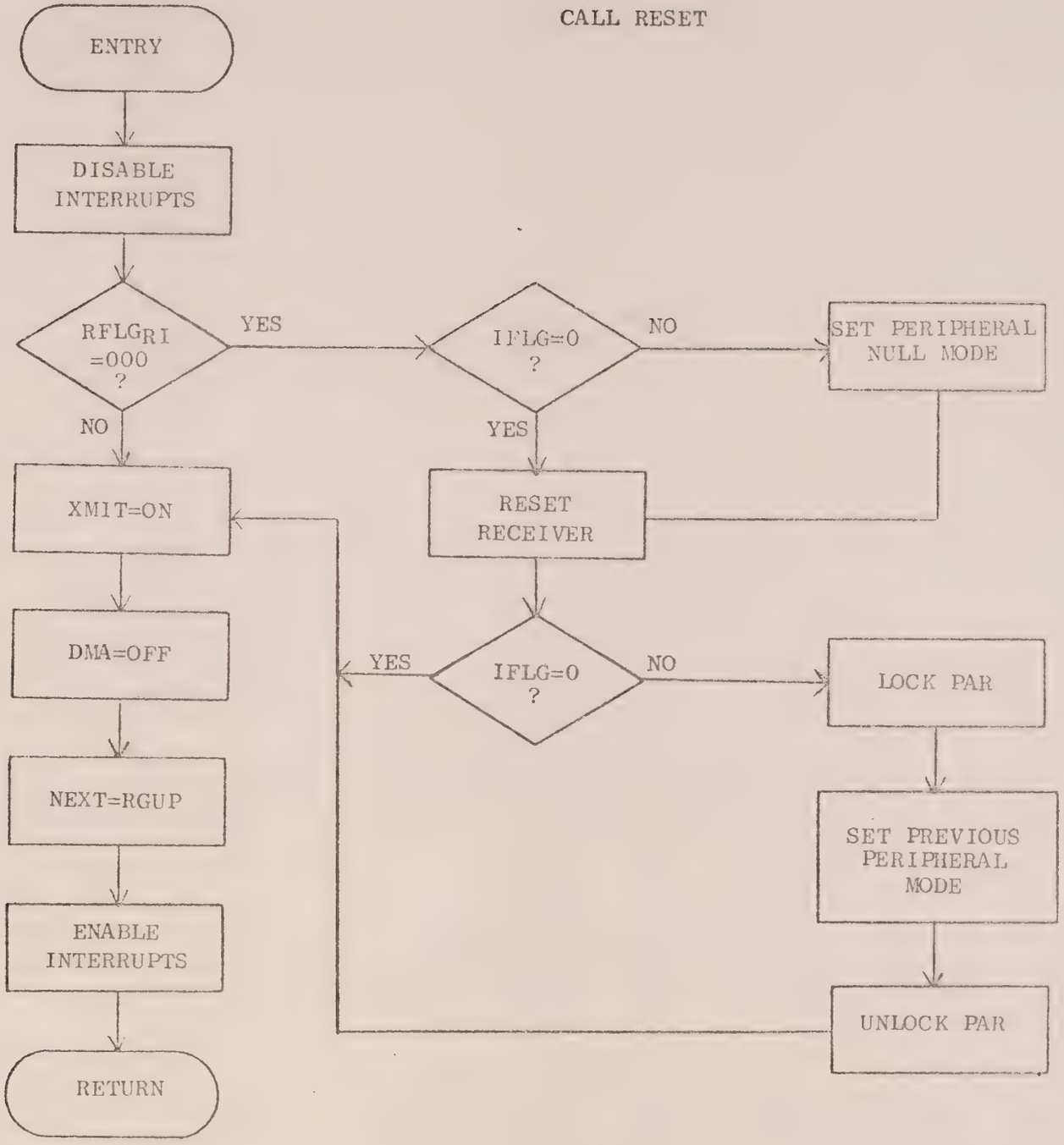

C
τ=0
?
YES
REMOTE=OFF
NO
RETURN
γ=SAVE(τ)
τ=τ-1
PKTB→ BUF
CALL MOVE
(PKTB,BUF)
A

REQSND

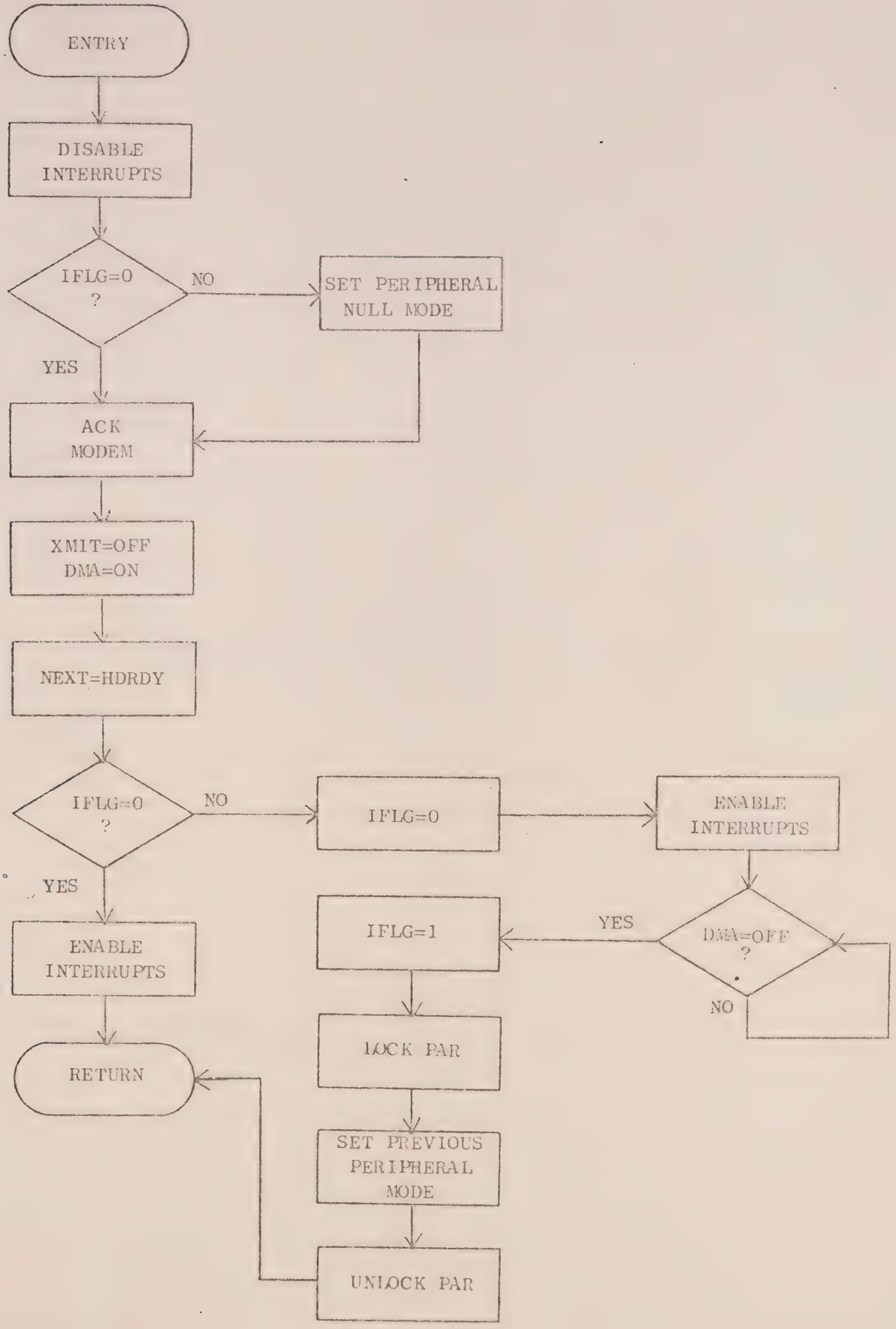

CALL REQSND
ENTRY
DISABLE INTERRUPTS
IFLG=0 ?
NO
SET PERIPHERAL NULL MODE
YES
ISSUE REQUEST TO SEND
DMA=ON NEXT=CLRSND
IFLG=0 ?
NO
IFLG=0
ENABLE INTERRUPTS
YES
ENABLE INTERRUPTS
IFLG=1
YES
DMA=OFF ?
NO
LOCK PAR
RETURN
SET PREVIOUS PERIPHERAL MODE
UNLOCK PAR

RESET

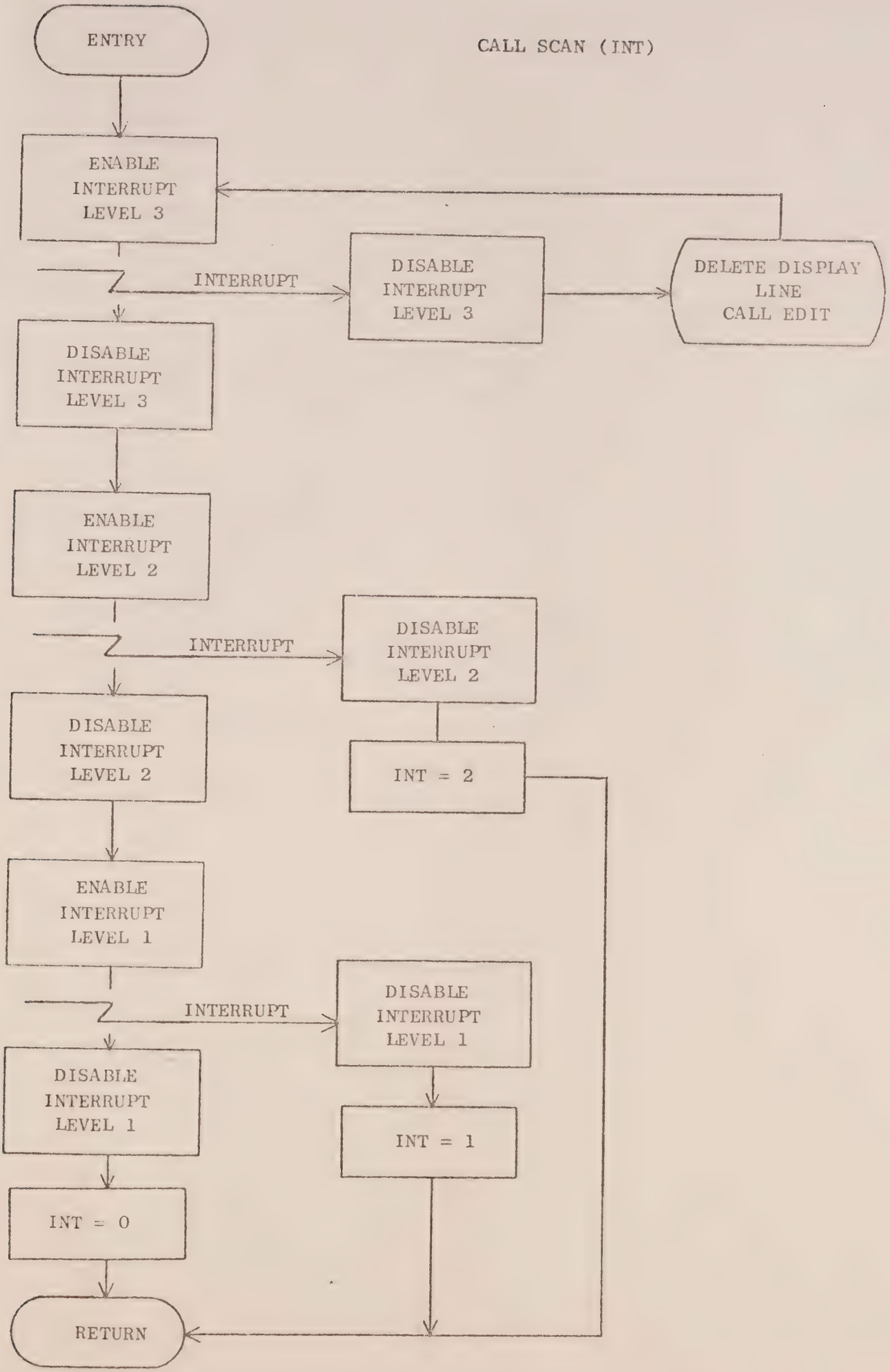
CALL RESET

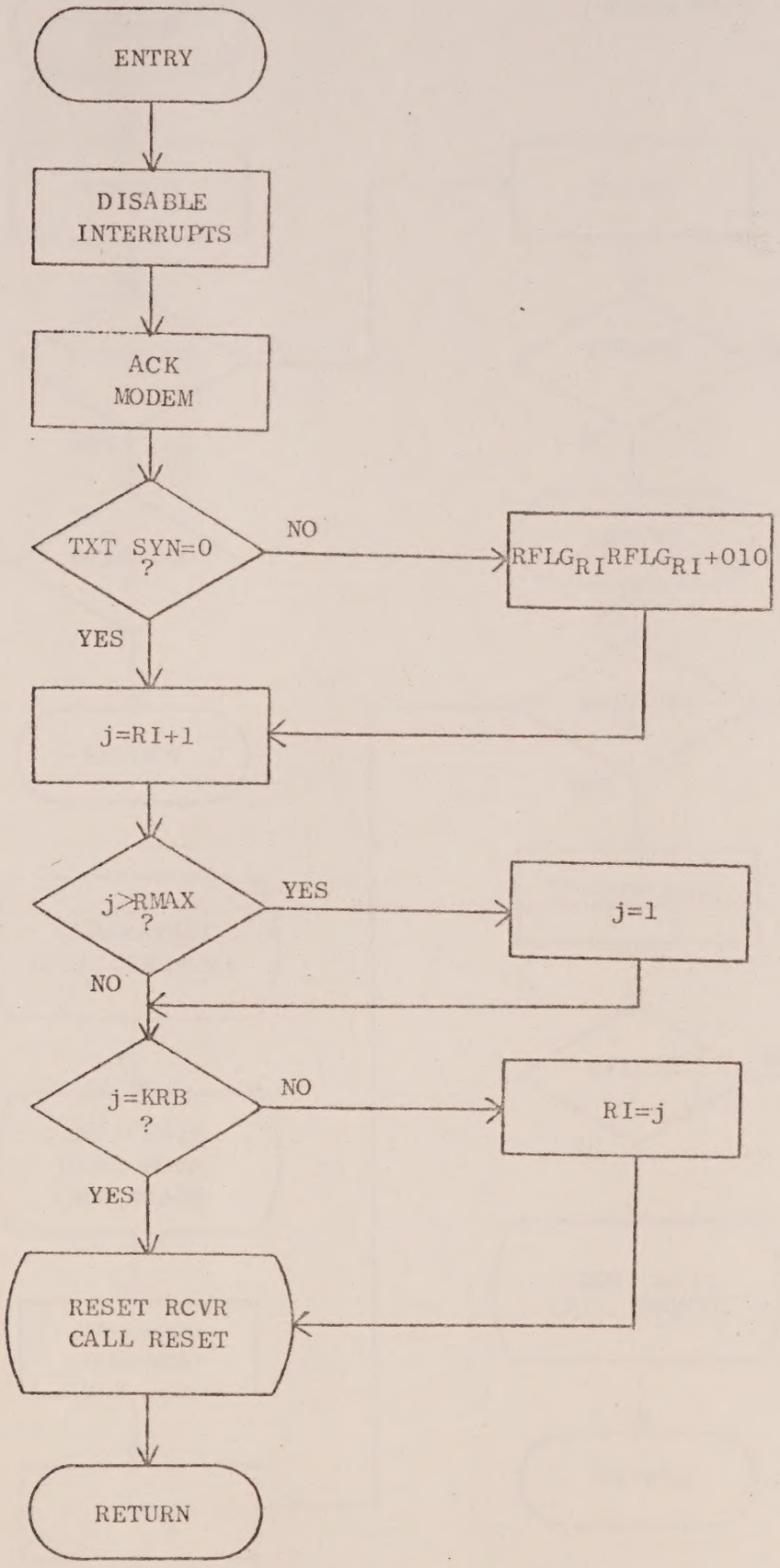


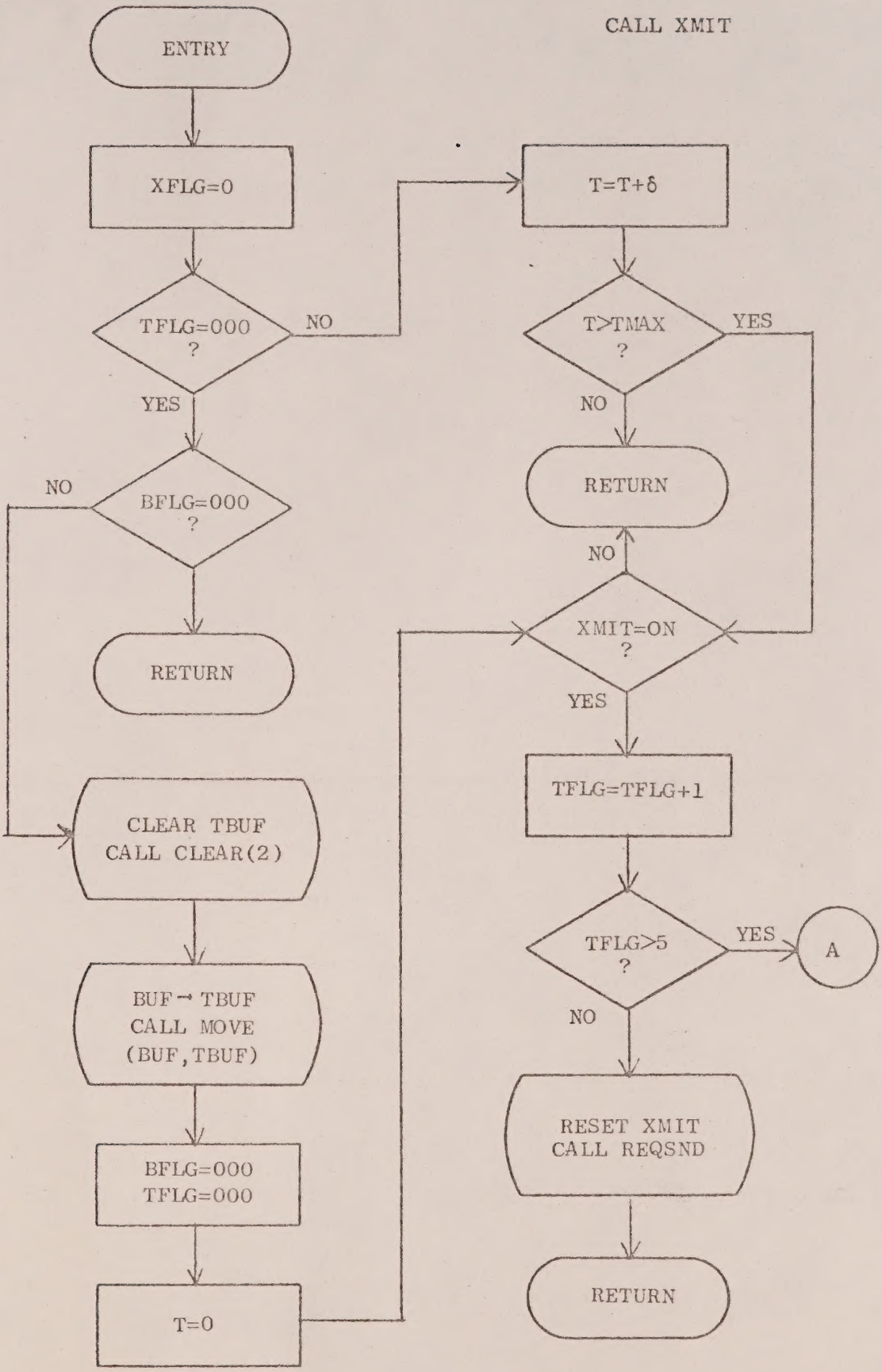
RGUP


ENTRY
DISABLE INTERRUPTS
IFLG=0 ?
NO
SET PERIPHERAL NULL MODE
YES
ACK MODEM
XMIT=OFF DMA=ON
NEXT=HDRDY
IFLG=0 ?
NO
IFLG=0
ENABLE INTERRUPTS
YES
ENABLE INTERRUPTS
IFLG=1
YES
DMA=OFF ?
NO
LOCK PAR
RETURN
SET PREVIOUS PERIPHERAL MODE
UNLOCK PAR

SCAN


ENTRY
CALL SCAN (INT)
ENABLE INTERRUPT LEVEL 3
INTERRUPT
DISABLE INTERRUPT LEVEL 3
DELETE DISPLAY LINE CALL EDIT
DISABLE INTERRUPT LEVEL 3
ENABLE INTERRUPT LEVEL 2
INTERRUPT
DISABLE INTERRUPT LEVEL 2
DISABLE INTERRUPT LEVEL 2
INT = 2
ENABLE INTERRUPT LEVEL 1
INTERRUPT
DISABLE INTERRUPT LEVEL 1
DISABLE INTERRUPT LEVEL 1
INT = 1
INT = 0
RETURN


ENTRY
DISABLE INTERRUPTS
ACK MODEM
TXT SYN=0 ?
NO
RFLG$_{RI}$ RFLG$_{RI}$+010
YES
j=RI+1
j>RMAX ?
YES
j=1
NO
j=KRB ?
NO
RI=j
YES
RESET RCVR
CALL RESET
RETURN


CALL XMIT
ENTRY
XFLG=0
TFLG=000 ?
NO
YES
BFLG=000 ?
NO
RETURN
CLEAR TBUF
CALL CLEAR(2)
BUF → TBUF
CALL MOVE
(BUF,TBUF)
BFLG=000
TFLG=000
T=0
T=T+δ
T>TMAX ?
YES
NO
RETURN
NO
XMIT=ON ?
YES
TFLG=TFLG+1
TFLG>5 ?
YES
A
NO
RESET XMIT
CALL REQSND
RETURN